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ABSTRACT

The primary reason for the Federal Highway Administration Cooperative Education Program is to work with colleges and universities in developing preprofessional personnel by assigning work projects which complement academic study. Primary responsibility for the program rests with the Office of Personnel and Training, with on-the-job supervision after placement in work assignments. Participant selection, student appointments, the plan of the training program, student evaluation, and training records are outlined, followed by a list of participating colleges and universities. Students are placed in civil service rankings from GS-2 to GS-5, according to experience and educational level. Duties are described for students at various levels and positions in engineering, accounting, and data processing. (SA)

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FEDERAL HIGHWAY ADMINISTRATION
COOPERATIVE EDUCATION PROGRAM

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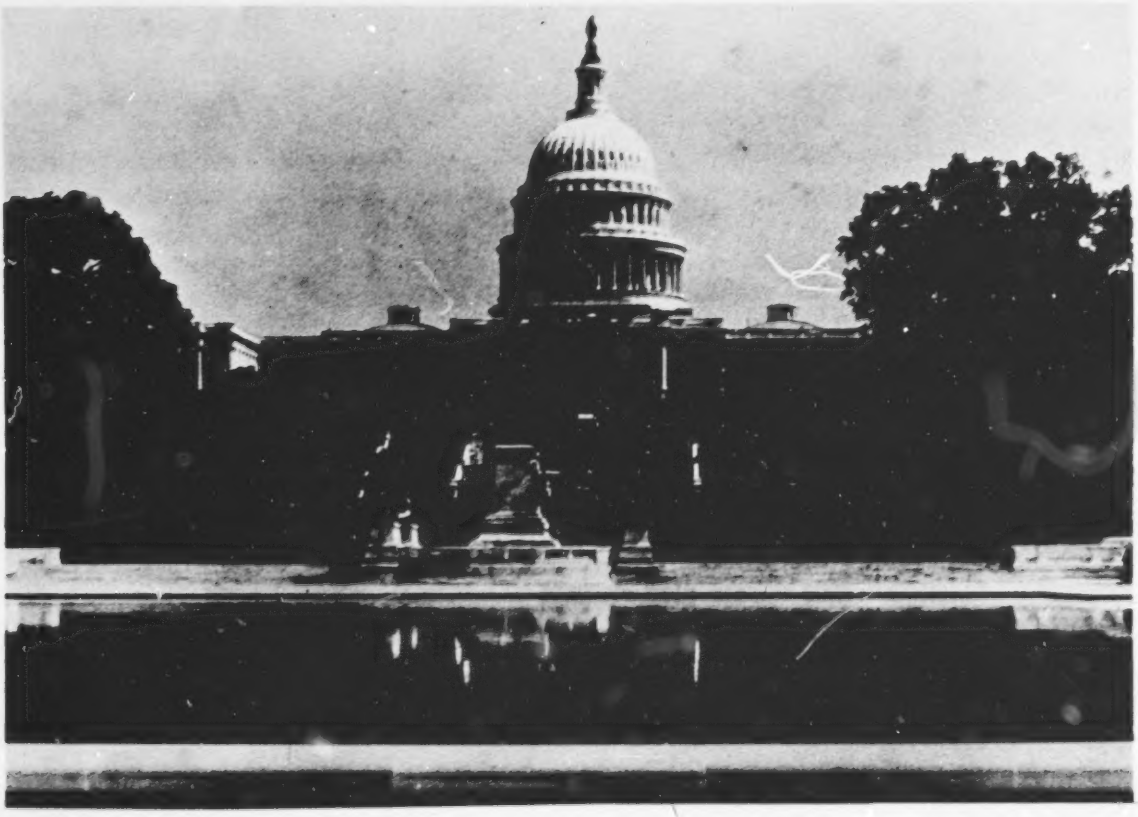
October 1974

FOREWORD

In 1969, the Federal Highway Administration began participating in cooperative education programs with colleges throughout the country. Since that time, a number of students have participated in work-study programs with FHWA, particularly in the areas of engineering, accounting, and data processing and have been assigned to work at FHWA Headquarters, or in regional or division locations.

On entering the Cooperative Education Program, the student may be assigned to one of a variety of work projects. The basic job responsibilities in engineering, accounting, and data processing are indicated further in this booklet according to grade. While employed, the student will be treated as any other employee hired under his appointment schedule.

As demands or opportunities arise, the Cooperative Education Program will expand to include other academic fields and new colleges or universities, which will follow the same plan and quality controls as set forth in this manual.



COOPERATIVE EDUCATION PROGRAM
FEDERAL HIGHWAY ADMINISTRATION

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I. REASON FOR THE COOPERATIVE EDUCATION PROGRAM

The primary reason for the Federal Highway Administration Cooperative Education Program is to cooperate with a college or university in developing pre-professional personnel by assigning work projects which complement academic study. The program affords the Federal Highway Administration and the college or university an opportunity to exchange ideas and techniques. The Federal Highway Administration also hopes to satisfy four other objectives by participating in this program: (1) to attract potentially high quality engineering, scientific, and professional personnel on a sound, long-range basis; (2) to increase its number of technically trained personnel by providing college training for some students who could not otherwise afford it and by increasing the student's interest in Federal Highway Administration occupations; (3) to assist in increased student academic performance by providing work assignments which are a valuable supplement to the trainee's academic work; and (4) to receive indirect benefits from a satisfied student who publicizes his successful experience by being appointed to one of the career training programs.

II. RESPONSIBILITY FOR THE PROGRAM

Primary responsibility for administration of the program rests in the Office of Personnel and Training. A Personnel Staffing Specialist serves as cooperative education coordinator. The coordinator synchronizes the movements of students between the schools and the Federal Highway Administration. Within the Federal Highway Administration, the coordinator sees that the students are oriented, placed in proper work assignments, evaluated, counseled, returned to school, promoted, etc. Further, the coordinator maintains relations with cooperative education schools to assure that mutual objectives are being met.

When the cooperative student is placed in his position, responsibility for his development through work assignments rests with the supervisor of the organization in which the student is employed. The student is placed in work assignments which are related to his career field and his stage of development. Thus, supervisors of various engineering, scientific, and administrative functions are responsible for students on the job.

III. POSITIONS COVERED

This training and promotion plan applies to employees who are engaged in a cooperative education program in engineering, scientific, and administrative fields at accredited colleges and universities. Positions are at GS-2 through GS-5 levels and apply to civil engineering, accounting, and data processing. Positions descriptions for grades GS-2 through GS-5 follow.

IV. METHOD OF SELECTING COOPERATIVE STUDENTS

Before students are brought into the Federal Highway Administration, they must have been enrolled or accepted for enrollment in a cooperative education program at an accredited college or university in a curriculum leading to the bachelor's degree with specialization in the field in which they will receive training on the job.

Students are selected for participation in the Cooperative Education Program on the basis of demonstrated scholastic ability. Each student must maintain a relatively high level of scholastic performance to remain in the Program. This responsibility rests with the sponsoring school. The Federal Highway Administration assumes a parallel responsibility which ensures the school and trainee full cooperation for maximum development of potential professional skills.

Besides requirements described above, the following additional requirements determine placement of the employee at the various grade levels upon entering on duty above the GS-2 level:

GS-3 level: one full academic year of study
GS-4 level: Two full academic years of study
GS-5 level: a) completion of three-fourths of the total number of periods of college study required for the bachelor's degree plus one period of employment as student trainee at the GS-4 level or
b) completion of 2½ years of academic study plus 6 months work experience as student trainee at the GS-4 level.

A "full academic year of study" is defined as a period or combination of periods of study at college equal in length to two semesters or three quarters.

A "period of study in college" is a semester or quarter of attendance in a regular full-time college in a cooperative curriculum. A "period of employment" is one of the work periods of an alternating work-study program of a cooperative curriculum, or part-time employment equivalent to 60 days full-time employment.

V. APPOINTMENTS

Student Trainees in non-shortage occupational groups are given "Excepted Appointments' under Schedule A, Section 213.3102(q) of the Excepted Civil Service Regulations. Shortage categories appointments are made under Schedule B, Section 213.3202(a). There is no provision for conversion to career status of student graduates under these authorities. All graduates must make early application under an appropriate civil service examination in order to be selected for competitive appointments.

Student Trainees who return to school after a work period will be placed in a "leave without pay" status with a "not to exceed" date indicated.

VI. PLAN OF TRAINING PROGRAM

The major portion of the in-service training period is devoted to on-the-job training. Trainees are assigned tasks according to their abilities as indicated by their training and experience. The duties assigned by the office or region involve the various and complex technical or professional aspects of the work of the organizational unit, and conform to the level of work and level of difficulty described in the position descriptions which are assigned. Assignments are carried out under the guidance of designated supervisory, technical or professional personnel in the respective functional areas during a period comparable in length to a study period. Whether the study period is a quarter or a semester depends on the system of the participating college or university.

As the student gains experience, he is promoted according to the requirements in the Civil Service Handbook X-118. The duties for GS-899, 599, and 099, which cover engineering, accounting, and data processing majors, are listed further in this booklet.

VII. EVALUATION OF STUDENTS

Student trainees are required to satisfy both the academic standards of the school and the work performance standards of the Federal Highway Administration. Any trainee who fails to maintain satisfactory progress will be dropped from the Federal Highway Administration's cooperative education program. The immediate supervisor of the student, together with the Federal Highway Administration's cooperative education coordinator, are largely responsible for determining whether the student is maintaining satisfactory progress.

The immediate supervisor keeps personal notes for a current progress record of the trainee and submits an evaluation to the Training Division, Office of Personnel and Training after the student has completed a training period. This evaluation includes the major assignments, the approximate time spent on each, and the overall performance of the student while on the job.

The supervisor considers such factors as ability to learn and retain knowledge and skills, industry, stability, quality of work, interest in assignments, oral and written expression, judgment, dependability, attitude, and overall performance. Although only one evaluation is required, the supervisor discusses progress with the student after each major assignment within the work period. He notes these discussions in the evaluation.

Each student also submits an evaluation of his work assignment to the Training Division upon completion of his work period. This is a report of his major and minor duties and time devoted to each. He also relates the significance of the work experiences to his courses in school.

Upon request, the cooperative director or a representative from the university may review the work assignments and the job performance of the student while actually on the job. At that time, the evaluator will be able to judge whether the student is learning material at work comparable to his level in school.

VIII. TRAINING RECORDS

An Official Personnel Folder, maintained by the Records and Reports Branch of the Office of Administration in the Federal Highway Administration, is kept on the cooperative student, as with any other employee, after he begins his first work period. It remains with the Federal Highway Administration for as long as the student is an employee with the agency.

The Personnel Operations Division of the Office of Personnel and Training maintains a file which contains the training agreements between the Federal Highway Administration and the college or university and general correspondence with the schools. This file is kept for two years after the agency has received this material and two years after the file has been closed.

IX. PARTICIPATING COLLEGES AND UNIVERSITIES

The Federal Highway Administration enters into training agreements with those colleges and universities that can meet its needs in engineering and business fields. The schools listed here have either entered into agreement with the agency in the past or are anticipating program participation soon. This list is not restrictive, however, since the number of agreements is determined by the size and scope of the FHWA Cooperative Education Program and the ability of the cooperating colleges to supply qualified students.

Alderson-Broadus College - Phillipi, West Virginia
Drexel Institute of Technology - Philadelphia, Pennsylvania
Federal City College - Washington, D.C.
Florida A & M University - Tallahassee, Florida
George Washington University - Washington, D.C.
Georgia Institute of Technology - Atlanta, Georgia
Howard University - Washington, D.C.
Johnson C. Smith University - Charlotte, North Carolina
Lees College - Jackson, Kentucky
Lincoln University - Jefferson City, Missouri
Louisiana State University - New Orleans, Louisiana
New Mexico State University - Los Cruces, New Mexico
North Carolina State University - Raleigh, North Carolina
Northeastern State College - Tahlequah, Oklahoma
Oregon Technical Institute - Klamath Falls, Oregon
Prairie View A & M College - Prairie View, Texas
Southern University - Baton Rouge, Louisiana
Syracuse University - Syracuse, New York
Tennessee A & I State University - Nashville, Tennessee
Tennessee Technological University - Cookeville, Tennessee
Texas Southern University - Houston, Texas
The Cleveland State University - Cleveland, Ohio
University of Detroit - Detroit, Michigan
University of Maryland - College Park, Maryland
University of South Alabama - Mobile, Alabama
University of South Florida - Tampa, Florida
University of Texas - Austin, Texas
University of West Florida - Pensacola, Florida
Virginia Polytechnic Institute and State University - Blacksburg, Virginia
Washington College of Engineering - Seattle, Washington
Wayne State University - Detroit, Michigan
West Virginia Institute of Technology - Montgomery, West Virginia
West Virginia State College - Institute, West Virginia
Wilberforce Universtiy - Wilberforce, Ohio

X. DUTIES OF COOPERATIVE STUDENTS

As previously stated, the FHWA and colleges cooperate in the work-study program in three specific areas - civil engineering, accounting, and data processing. The student, according to his year in school and previous cooperative work experience is employed at grade levels from GS-2 to GS-5. The participant may also be scheduled to work at FHWA Headquarters or in a regional or division location more convenient to his school or home.

The following are brief descriptions of duties the cooperative student may have, according to grade level, in the training program of his career specialty.

A. Engineering Student Trainees (899)

The engineering student may be employed in Region 15 (in Arlington, Virginia) or nationwide for the Office of Research and Development - a) Engineering Systems Division or, b) Structures and Applied Mechanics Division or, c) Traffic Systems Division. Some of the duties and responsibilities according to grade and location follow.

1. Engineering Student Trainee (899)

Region 15

The region, in cooperation with the National Park Service, the Forest Service, and other Federal agencies having jurisdiction over the lands involved, is responsible for design and construction of parkways and major roads in the national parks, monuments, and forests, as well as on Indian and military reservations.

Duties may include the following:

GS-2

(1) Performs assignments often repetitive in nature and of limited complexity.

(2) Makes simple computations, drawings, tracings, etc., connected with preliminary or final phases of highway construction projects.

(3) Assists higher grade personnel in areas of planning, location, design, materials, construction, and other supporting disciplines associated with highway engineering while serving as a survey team member at a regional or division level.

GS-3

(1) Drafts and traces preliminary line and route studies; transfers lines from topo maps to aerial photos.

(2) Assists in coding ADP computations for P-line, right-of-way areas, earthwork, etc.

(3) Assists in soil borings, and computing quantities for engineer's estimates.

(4) Assists in checking final construction reports, and in preparing progress charts, work schedules, cost tabulations.

(5) Makes density tests on embankments or in a laboratory; makes sieve analysis of aggregates for cement concrete and base course material.

(6) Operates simple machinery on routine tests.

(7) Sets up targets for aerial survey ground control.

(8) Acts as chairman using hand level, or performs rod work on major project.

GS-4

(1) Compiles bid tabulations; assists in making preliminary line and grade interchange studies.

(2) Keeps field level and other notes and reduces same through computation and engineering checks; solves basic trigonometry problems.

(3) Codes ADP computations for right-of-way areas; sets up jobs for ADP runs and checks engineering data before and after processing.

(4) Computes reinforcement and structural steel quantities under supervision of bridge engineers or technicians.

(5) Assists in reviewing adequacy of soils and materials control during construction.

(6) Assists in preparing contract progress estimates and cost reports.

(7) Assists in making preliminary line surveys; sets up laboratory apparatus and makes sieve analysis, concrete yield tests, etc., without close supervision.

(8) Directs the work of subordinate aids in accordance with established procedures and practices, as required.

GS-5

(1) Assists in the preparation of feasibility studies, reports, preliminary engineer's estimates, etc.

(2) Draws graphic profiles of interchange ramps; prepares soil profiles and tabulates boring logs; computes grades, vertical curves, alignment, etc.

(3) Checks simple design computations; checks structural steel quantities on shop drawings.

(4) Assists in reviewing PS&E papers for construction features; makes field trips with quality control engineer or materials engineer.

(5) Assists in programing and ADP system work.

(6) Performs as head chairman on survey work; keeps accurate notes for surveys; assists project engineer in inspection of pipe culverts, grading, base course placement, etc.

(7) May provide technical guidance to lower grade engineering aids in the performance of their work.

2. Engineering Student Trainee (899)

Office of Research and Development
Engineering Systems Division
Methodology Task Group

The Engineering Methodology Task Group is responsible for planning, conducting and coordinating long-range and short-range studies dealing with improved highway engineering methodology through the adaptation of new technological developments such as the electronic computer and associated devices and techniques, to all phases of highway engineering.

Duties may include the following:

GS-2

(1) Operates automatic data processing equipment, such as keypunch, paper tape reader and writer, teletypewriter, card reader, card punch unit, and line printer, which are located at the Fairbank Highway Research Station.

(2) Learns the basics of a computer time-sharing service.

(3) Routes and schedules ADP work consisting of data and computed results, between the Engineering Systems Division located at FHRS and the Computer Services Division, which is located in the central offices of the Federal Highway Administration.

(4) Assists civil engineers in preparing data for subsequent analysis by electronic computer methods.

(5) Performs computer runs from remote terminals on a time-shared computer service as directed by a project engineer.

GS-3

(1) Assists project engineers in preparing computer programs for engineering applications in the FORTRAN programing language.

(2) Assists an engineer in testing, correcting and implementing these engineering application programs either on a time-shared computer service or on equipment operated by the Computer Services Division in the Federal Highway Administration.

(3) Assists research personnel in obtaining computer/plotter produced plan, profile and perspective drawings that are produced as a result of a research project.

(4) Assists an engineer responsible for the operations of computer time-sharing terminals.

GS-4

(1) Serves as member of a study team working on the Total Integrated Engineering Systems (TIES) project.

(2) Assists the study team leader of TIES study in developing engineering application programs in FORTRAN or COBOL compucer program languages from flow charts and verbal instructions.

(3) Assembles material on available engineering application programs for distribution to State and other highway engineering agencies.

(4) Assists engineers and scientists in preparing sample problem data, testing and correcting engineering application programs.

(5) Processes data on the computer in support of other highway engineering research and development activities, such as, materials testing, photogrammetry or hydraulic studies.

(6) Assists the engineer responsible for the management and operation of automatic data processing equipment which functions as a remote terminal to a complex computer system.

(7) Handles other specific duties related to highway engineering and data processing as directed by the study team leader.

GS-5

(1) Continues functioning as a study team member on the Total Integrated Enginering Systems (TIES) project with increased individual responsibility for contributing to the development of engineering application programing methods of the total system.

(2) Has personal responsibility for preparing necessary job control and the testing of computer programs on the central computer system of the Federal Highway Administration with minimum of engineering team leader supervision.

3. Engineering Student Trainee (899)

Office of Research and Development
Environmental Design and Control Division

The Environmental Design and Control Division is responsible for planning, conducting and coordinating research:

- To develop highway and street design standards and specific remedial techniques for improving the safety of highway users;

- To determine and maintain mutually beneficial relationships between the highway system and its immediate and remote environment.

Achievement of these goals is accomplished by optimizing safety, operational benefits, social and engineering costs.

Duties may include those such as the following:

GS-2

(1) Assists engineers, technicians, and other research professionals with tasks involved in gathering field data for research studies in safety and environmental assessment.

(2) Assists in the installation, operation and maintenance of the equipment necessary for the conduct of the research study.

(3) Records, processes and analyzes field data.

(4) Monitors the operation of traffic recording equipment and manipulates the equipment as directed.

GS-3

(1) Assists research professionals in the field collection of data using both automated and manual techniques.

(2) Participates in making preliminary site investigations and surveys of potential study locations.

(3) Plots data and performs data analysis.

(4) Computes basic statistical indices from processed data.

GS-4

(1) Assists research professionals in development of data survey formats, and in selection of field installations.

(2) Prepares simple engineering drawings, and fabricates basic models of behavioral and environmental subsystems.

(3) Assists research professionals in the conduct of field and laboratory experiments; prepares data for analysis; and conducts simple statistical analysis.

GS-5

(1) Assists research professionals in preparing data analysis in final form.

(2) Evaluates results of statistical tests for significance.

(3) Prepares final charts and graphs showing research results.

(4) Assist in preparation of the FY-1976 research program by developing the necessary background information for and preparing requests for proposal for contract research to the RFP.

(5) Prepare a "state-of-the-art" paper on a specific geometric design element or method.

(6) Prepare a "position" paper on new highway design innovations.

(7) Plan and carry out specific staff research to meet the goals of the project.

(8) Attend a technical meeting either as an observer or to deliver a paper developed through his own efforts.

4. Engineering Student Trainee (80099)

Offices of Research and Development
Implementation Division

The Implementation Division, Office of Development, is responsible for the practical utilization of research results and new developments in the highway engineering area. In order to insure efficient and timely transfer of new technology, it is necessary to develop user manuals, computer programs, training curriculums, visual aid packages, and other types of promotional informational, and instructional materials.

The Implementation Division consists of two groups:

The Engineering, Location & Design Group is responsible for the practical utilization of research results and new developments pertaining to traffic control and operation, geometric and structural design, protective barrier systems, highway locations, environmental design and control, engineering methodologies, and hydraulics and hydrology.

The Construction Materials and Methods Group is responsible for practical utilization of research results and new developments pertaining to construction methods, construction materials, maintenance methods processes and equipment.

There are six project areas contained within these two groups.

These are:
(1) Construction and Maintenance Materials Project
(2) Construction and Maintenance Methods and Equipment Project
(3) Traffic Engineering Project
(4) Highway Location & Design Project
(5) Structural Design Project
(6) Maintenance Criteria, Equipment and Systems Project

Typical duties are as follows:

GS-2

1. Assist engineers and technicians (Implementation Managers) with the tasks of preparing brocures and promotional materials for implementation items.

2. Performs assignments often repetitive in nature and of limited complexity.

3. Makes simple computations, drawings, etc., in connection with the preparation of implementation packages.

4. Operates various types of visual aids equipment including video recorders, slide projectors, movie projectors, etc., and aids in preparation of visual aids.

GS-3

1. Prepares simple brochures.

2. Aids in the preparation of implementation packages.

3. Aids in the evaluation of research products and other new products emanating from sources other than research.

4. Assists in the preparation of visual aid packages.

GS-4

1. Assists engineers in processing data for ADP methods and evaluating simple computer programs which are designed to be used by highway agencies.

2. Prepares simple implementation reports.

3. Aids in the preparation of complex implementation packages.

4. Prepares simple visual aid packages either developing the material himself or coordinating with the Graphics people in the Office of Administration, and aids in the presentation of these materials.

GS-5

1. Assists in the preparation of validation studies, reports, and preliminary RFP's.

2. Prepares test problems for determining the usability of computer programs.

3. Checks the usability of implementation or user packages prepared by State highway departments and other organizations by working sample problems and going through the necessary engineering computations.

4. Assists in reviewing complex development efforts and implementation packages; occasionally, makes field trips with the Implementation Manager.

5. Assists in programming an ADP System.

6. May aid in the evaluation of contract proposals which are not complex in nature.

7. May provide technical guidance to lower grade engineering aids in the performance of their work.

5. Engineering Student Trainee (899)

Office of Research
Materials Division

The Materials Division plans, conducts, and coordinates research to provide more reliable insights into the mechanical, physical and chemical behavior of highway construction materials to improve the performance of such materials and reduce costs, develop new materials or material systems and provide remote sensing techniques for gathering data or measuring material characteristics.

Typical Duties are as follows:

GS-2

1. Assist engineers and technicians with the tasks of setting up test equipment and preparation of materials and test specimens for staff research studies.

2. Assist in the treatment of test specimens and testing of materials.

3. Perform routine calculations for staff research studies.

4. Assist in computer file management operations.

GS-3

1. Perform simple equipment set-ups.

2. Fabricate routine type test specimens or samples.

3. Record test data and perform necessary calculations by use of desk type calculators.

4. Perform simple tests on concrete, bituminous mixtures and soil materials.

GS-4

1. Make equipment set-ups for more difficult type experiments and assist engineers or technicians in construction of sophisticated test systems.

2. Perform routine tests on concrete bituminous mixtures and soil materials.

3. Assist engineers in processing data by ADP methods.

GS-5

1. Design simple experiments and test methods and/or test equipment.

2. Prepare simple computer programs for manipulation of test data.

3. Conduct simple experiments and prepare reports of work.

4. Assist research engineers in the conduct of staff research studies; prepares summaries of data; and prepares draft of charts and graphs showing research results.

6. Engineering Student Trainee (899)

Office of Research and Development
Structures and Applied Mechanics Division

The Structures and Applied Mechanics Division is responsible for: Planning, conducting and coordinating long-range and short-range research studies concerned primarily with the structural adequacy of all components of the highway plant (including resistance to environmental effects); pavement design and analysis, bridge design and

analysis, embankments and foundations, the mechanistic behavior of materials under stress, tunnels, culverts, protective highway barriers (impact attenuators and longitudinal barriers), and life expectancy determination of pavements and bridges.

Duites may include those such as the following:

GS-2

(1) Is assigned to work in any of the various project areas which include: (a) Protective Highway Barriers; (b) Pavement Systems; (c) Bridges and Other Structures; (d) Nondestructive Testing and Development of Devices; (e) Tunnels and Culverts; and (f) Special Work on Research Contracts.

(2) Assists research engineers and technicians in these areas by carrying out such tasks as: performing arithmetic computations; recording instrument readings, running simple laboratory tests, abstracting test data from records and plotting coordinates, assisting in assembly, installation and operation of equipment and instruments.

(3) Works in the office, laboratory and field, as required by the nature of assignments.

GS-3

When assigned to the Protective Systems Group project areas:

(1) Assists research engineers and technicians in safety research type studies.

(2) Records and/or assembles data from field research studies.

(3) Prepares tables and graphic displays.

When assigned to the Pavement Systems Group project areas:

(1) Assembles data from research studies and prepares tables and graphs.

(2) Uses slide rule and electric calculator in reducing data.

(3) Does drafting.

(4) Helps with physical work of assembling load frames and test set-ups.

When assigned to the Bridge Structures Group project areas:

(1) Assists structural research engineers and technicians in selecting, setting up, and calibrating equipment for conducting various research tests and experiments in the structural laboratory, aerodynamic laboratory and during field investigations on full-scale structures.

GS-4

When assigned to the Protective Systems Group project areas:

(1) Participates in safety research type studies.

(2) Assists research engineers and technicians in conducting field research and laboratory studies relating to such matters as pavement skid characteristics, frangible structures, and redirectional traffic barriers.

When assigned to the Pavement Systems Group project areas:

(1) Assists research engineers and technicians in the conduct of laboratory tests.

(2) Records and/or assembles data from research studies and prepares tables and graphs.

(3) Performs drafting and slide rule and calculator-type computations.

(4) Reduces analog graphs to digital data.

When assigned to the Bridge Structures Group project areas:

(1) Assists structural research engineers and technicians in selecting, setting up, and calibrating equipment for conducting various research tests and experiments in the structural laboratory, aerodynamic laboratory and during field investigations on full-scale structures.

(2) Assists in deriving mathematical relationships from test data, and plots curves to relate these to the test conditions and the structure behavior.

GS-5

When assigned to Protective Systems Group project areas:

(1) Assists research engineers and technicians in conducting and summarizing field research studies.

(2) Develops, plans and executes field assignments of limited scope.

(3) Prepares preliminary analyses and evaluations of data from assigned study topics.

(4) Develops support documentation relevant to these topics.

When assigned to the Pavement Systems Group project areas:

(1) Assists research engineers and technicians.

(2) Conducts laboratory tests, performs analysis and draws conclusions, records and/or assembles data from research studies.

(3) Prepares tables and graphs.

(4) Uses electric calculator and electronic computer to run routine programs.

When assigned to the Bridges and Structures Group project area:

(1) Assists structural research engineers and technicians in selecting, setting up, and calibrating equipment for conducting various research tests and experiments in the structural laboratory, aerodynamic laboratory and during field investigations on full-scale structures.

(2) Assists in deriving mathematical relationships from test data, and plots curves to relate these to the test conditions and the structure behavior.

(3) Becomes familiar with a variety of electronic instrumentation used in the conduct of structural research tests so that he will be able to operate them during testing.

7. Engineering Student Trainee (899)

Office of Research and Development
Traffic Systems Division

The Traffic Systems Division plans, conducts, and coordinates research and development in the dynamics of vehicular movement to include: The performance and the related demands and consequences of vehicular movement; the nature of the traffic flow process; the capabilities of the driver in highway transportation system design and development; accidents and safety; traffic movement and control on street and highway networks; and the design and operating characteristics of highways and highway systems.

Duties may include the following:

GS-2

(1) Assists engineers, technicians, and experimental psychologists with the more simple tasks covered in gathering field data for research studies in traffic operation. This involves detailed observations of traffic movement, driver and vehicle characteristics.

(2) Assists in the installation, operation and maintenance of the equipment necessary for the conduct of the research study.

(3) Relieves technicians of the routine operations performed in recording and processing data, such as keeping field notes and performing simple calculations.

(4) Monitors the operation of traffic recording equipment in the field and is capable of manipulating the equipment in accordance with a preinstructed plan.

GS-3

(1) Assists Highway Research Engineers in field collection of traffic data by manual methods as well as by use of the Traffic Impedance Analyzer.

(2) Participates in making preliminary site surveys of potential study locations.

(3) Plots data and performs some data analysis.

(4) Computes volumes and averages from processed data.

GS-4

(1) Assists Highway Research Engineers by performing traffic data analysis. Operates computer terminal and feeds data banks into existing programs. Plots and analyzes graphs of data; establishes manipulation of data.

(2) Prepares simple engineering drawings. Fabricates simple circuitry for minor equipment alteration; performs routine maintenance and resting of electronic instruments; performs computation of differential equations; and assists scientists and technicians in setting up field and laboratory equipment.

(3) Assists professional psychologists in the conduct of field and laboratory experiments; prepares data for analysis; and conducts simple statistical analysis.

(4) Prepares drafts of introductory and study procedure sections of technical reports.

GS-5

(1) Assists research engineers in preparing data analysis in final form.

(2) Prepares final charts and graphs showing research results.

(3) Prepares and debugs computer programs for statistical tests and manipulation of data.

(4) Evaluates results of statistical tests for significance.

(5) Co-authors, with supervisory engineer/scientist complete short technical reports on small staff studies.

B. Accounting Student Trainee (599)

The cooperative education student may work in either FHWA Headquarters Administration or in an Accounts Section of the regional offices.

Duties may include such as the following:

GS-2 through 5

(1) Works in a region or one of the different sections within the Accounting Reports and Services Branch of the Finance Division. These sections include: Data Collection and Examination, Financial Reports and Statements, General Ledger and Funds Control, Payroll and Employee Records and Voucher Review and Disbursements.

(2) Independently carries out such tasks as maintaining various journals, or subsidiary ledgers, reviews the more difficult payroll reports, reviews recurring types of adjustments for which procedures are well established.

(3) Assists in the coding of tabulations and reports, reviews vouchers varying in degrees of difficulty, and performs general clerical duties relating to the accounting functions.

(4) Incumbent works under the general supervision of a section chief. Receives general instructions as to work arrangement, operation and manner in which data are to be reviewed and recorded. His performance is reviewed for accuracy and reasonableness.

C. Data Processing Student Trainee (099)

In the Office of Administration, Data Systems Division, the student trains in all aspects of data processing or reviews needed aspects of previous training. He then is placed in an application area to acquire actual experience under the guidance of an experienced programmer or systems analyst. If he has had previous experience with FHWA in the Cooperative Education Program, he is reassigned to his previous application area or to another application area as needed.

Duties may include the following:

GS-2

(1) Receives preliminary training in Computer Fundamentals, COBOL, Job Control Language, and Systems Analysis.

(2) Performs on-the-job training in data preparation to reinforce his earlier theoretical training in input forms preparation, design and analysis.

(3) Performs on-the-job training in operations to reinforce earlier theoretical training in Job Control Language. This enabling him to prepare data correctly and to use correct procedures when submitting data and programs to operations for processing.

(4) Receives additional training in COBOL and/or FORTRAN according to his areas of interest or aptitude.

GS-3&4

(1) Receives preliminary instruction or review according, to his needs, in Systems Fundamentals, COBOL, JCL, Systems Analysis and/or application area or to another application area as needed.

(2) Uses his scholastic background and on-the-job training to analyze problems and subdivide them into procedural steps to create processes for resolving the problem and presenting the results in tabular or graphic form using Large Scale digital computers. The size and complexity of these problems will depend on the trainee's demonstrated ability and experience.

(3) Develops ability and efficiency in handling problems of at least minimum complexity and/or minimum time restrictions. Satisfactory performance is determined by the individual supervisor based on the amount the trained surpasses minimum allowable standards.

GS-5

(1) Receives a brief review according to his needs in Systems Fundamentals, COBOL, JCL, Systems Analysis and/or FORTRAN. Special utilities and utilization of interactive terminals. After review he is reassigned to his previous application area or to another application area as needed.

(2) Is immediately expected to perform efficiently in problems of at least average complexity and/or average time restrictions using mathematical analysis, algebra, or logic to create computer programs to process data in tabular or graphic form.

(3) Attains satisfactory performance determined by the individual supervisor based on the amount he surpasses minimum allowable standards and the degree of resourcefulness and creativity he exercises in the problems given.